REMARKS

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, in light of the remarks which follow, are respectfully requested.

By the foregoing amendments, claim 1 has been amended to further recite a thermoplastic polymer having a softening temperature by the ring and ball method of 50 to 120°C and lower than the curing temperature. This amendment is supported by the specification, for example, page 18, lines 4-11.

Upon entry of the Amendment, claims 1-26 will be all the claims pending in the application.

I. Response to Rejections under 35 U.S.C. § 103(a)

a. Claims 1-12, 15-23 and 26 have been rejected under 35 U.S.C. §103(a) as obvious over Japanese Patent Document No. 05-295807 to Kunihiro et al. ("JP '807") in view of U.S. Patent No. 4,778,851 to Henton et al. Applicants respectfully submit that the claims as amended are patentable over the cited references for at least the following reasons.

Independent claim 1 recites a liquid crystal sealing agent composition that is a one-component resin composition and is light-curable and heat-curable at a curing temperature, comprising:

(1) a solid epoxy resin having a softening temperature by the ring and ball method of 40°C or above;

(2) an acrylate monomer and/or a methacrylate monomer, or an oligomer thereof;

(3) *a thermoplastic polymer having a softening temperature by the ring and ball method of 50 to 120°C and lower than the curing temperature*, the thermoplastic polymer

being obtained by copolymerizing an acrylate monomer and/or a methacrylate monomer with a monomer copolymerizable therewith;

(4) a light-activated radical polymerization initiator; and

(5) a latent epoxy curing agent.

JP '807 discloses a liquid crystal sealing agent that is a one-component light and heat-curable resin comprising:

(a) a partial acrylized or a partial methacrylized epoxy resin;

(b) an acrylate or a methacrylate, or an oligomer thereof;

(c) a solid epoxy resin with a softening point above 40°C;

(d) a light-activated radical polymerization initiator; and

(e) a latent epoxy curing agent.

However, JP '807 fails to disclose a composition including a thermoplastic polymer having a softening temperature by the ring and ball method of 50 to 120°C and lower than the curing temperature, which is obtained by copolymerizing an acrylate monomer and/or a methacrylate monomer with a monomer copolymerizable therewith, as recited in present claim 1.

Further, Henton et al. discloses toughening a wide variety of epoxy resins by adding thermoplastic grafted rubber particles having a core-shell structure, wherein the grafted rubber particles comprise an acrylate core and an ethyl acrylate/methacrylic acid copolymer shell in a preferred embodiment.

The Office Action asserts that "Henton et al. discloses that the grafted rubber particles maintain a substantially constant morphology during curing conditions (i.e. the softening point is above the curing temperature). It is noted that the curing temperature disclosed by [JP '807] is as low as 100°C. It would have been obvious to one of ordinary skill in the art at

the time of invention to include a thermoplastic component with a softening point above the handling and processing temperatures as taught by Henton et al. in order to improve the toughness of component (c) disclosed by [JP '807]" (page 3, line 21 to page 4, line 7 of the Office Action).

Applicants respectfully submit that Henton et al. teaches away from the presently claimed composition containing a thermoplastic polymer having a softening point lower than the curing temperature, as recited in present claim 1, which is molten and does not maintain a constant morphology during curing conditions.

As such, even if Henton et al. and JP '807 are combined, the combination still would not result in the subject matte of claim 1.

Furthermore, the object of adding thermoplastic grafted rubber particles in Henton et al. is to toughen a wide variety of epoxy resins as described therein.

To the contrary, in the presently claimed invention, a thermoplastic polymer having a softening temperature of 50 to 120°C and lower than the curing temperature is added to be molten and compatibilize, e.g., (1) a solid epoxy resin with (2) an acrylate monomer and/or a methacrylate monomer, or oligomer thereof, and to swell the compatibilized thermoplastic polymer to prevent viscosity decrease of the liquid sealing agent composition before curing, and to prevent the constituents of the liquid crystal sealing agent composition from exuding and diffusing into the liquid crystal, as described at page 18, lines 4-14 of the present specification.

Because the constitution as well as the objects between Henton et al. and the presently claimed invention are much different from each other, there would not have been motivation to combine JP '807 with Henton et al. to achieve the presently claimed invention.

Moreover, as can be seen from the results in the following Table 2 that is contained in a Declaration previously submitted on April 7, 2008:

Table 2

Test item Example	EX. 1	EX. 2	EX. 3	EX. 4	EX. 5	Comp. EX. 1	Comp. EX. 2	Comp. EX. 3	Comp. EX. 4
Liquid crystal sealing agent composition	P1	P2	P3	P4	P5	C1	C2	C3	C4
Viscosity stability	A	A	A	A	A	A	A	C	A
Glass transition temperature of light cured product (℃)	86	88	86	83	89	55	59	—	92
Gel fraction of heat cured product (%)	82	88	86	83	84	78	55	—	91
Cell gap size stability test	A	A	A	A	A	B	B	—	A
Bonding strength after light curing (MPa)	5.1	3.1	4.0	4.2	4.9	4.8	0.1	—	3.2
Bonding strength after light and heat curing (MPa)	20.2	17.5	19.0	17.8	19.0	16.0	1.2	—	15.0
Display characteristics test of liquid crystal display panel	A	A	A	A	A	B	C	—	A
Display characteristics test of shaded area of liquid crystal display panel	A	A	A	A	A	B	C	—	B

Examples 1 and 5 (containing a thermoplastic polymer having a softening temperature of 80°C and 105°C, respectively) exhibited results superior to Comparative Example 2 (containing no thermoplastic polymer) in terms of glass transition temperature of light cured product, gel fraction of heat cured product (at 120°C), cell gap size stability test, bonding strength after light curing, bonding strength after light and heat curing (at 120°C), display characteristic test of liquid crystal display panel, and display characteristic test of shaded area of liquid crystal display panel. In addition, Examples 1 and 5 exhibited results superior to

Comparative Example 3 (containing a thermoplastic polymer having a softening temperature of 40°C) at least in terms of viscosity stability. Furthermore, Examples 1 and 5 exhibited results superior to Comparative Example 4 (containing a thermoplastic polymer having a softening temperature of 122°C) in terms of bonding strength after light curing, bonding strength after light and heat curing, and display characteristic test of shaded area of liquid crystal display panel.

These data show that the liquid crystal sealing agent composition using a thermoplastic polymer having a softening point of 50 to 120°C and lower than the curing temperature, as defined in present claim 1, can provide results superior to those outside the scope of present claim 1.

Neither JP '807 nor Henton et al. discloses or suggests these superior results obtainable with the liquid crystal sealing agent composition, as defined in present claim 1.

The Office Action also asserts that "it appears from the original disclosure that a thermoplastic polymer with a softening temperature of 40°C produces the same superior results (the examiner notes P2 as defined on page 52 of the specification indicates such a softening temperature and Table 2 provides that P2 shows the same unexpected results as P1 and P3-P5)" (page 8, lines 9-13 of the Office Action).

The Examiner appears to misread the description in the present specification. Specifically, the thermoplastic polymer with a softening temperature of 40°C produced in Synthesis Example 2 as described at page 52 of the specification was used in Comparative Example 3 (C3) as shown in Table 1, and the resultant composition exhibited poor results at least in terms of viscosity stability, as described above.

In view of the foregoing, Applicants respectfully submit that claim 1 is not obvious over JP '807 in view of Henton et al. and thus the rejection should be withdrawn.

Additionally, claims 2-12, 15-23 and 26 depend from claim 1 and thus are patentable over the cited references at least by virtue of their dependency.

b. Claims 13, 14, 24 and 25 have been rejected under 35 U.S.C. § 103(a) as obvious over JP '807, U.S. Application Publication No. 2007/0122742 to Kato et al. and Henton et al., and further in view of Japanese Patent Document No. 63-179323 to Nobumasa et al. ("JP '323"). Applicants respectfully submit that the claims are patentable over the cited references for the same reasons as set forth above.

Furthermore, Kato et al. is relied upon as merely disclosing the softening point for EOCN-1025. Further, JP '323 is relied upon as disclosing a method for preparing a liquid crystal display element without allowing air bubbles to remain in the liquid crystal by dropping a required amount of weighed liquid crystal on the inside of the sealing agent and thereafter curing the sealing agent. Neither Kato et al. nor JP '323 rectifies the deficiencies of JP '807 and Henton et al. Therefore, even if JP '807 and Henton et al. are combined with Kato et al. and JP '323, the combination still would not result in the subject matter of claim 1.

In view of the foregoing, Applicants respectfully submit that claim 1 is not obvious over the cited references. Claims 13, 14, 24 and 25 depend from claim 1, directly or indirectly, and thus are patentable over the cited references at least by virtue of their dependency. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

II. Conclusion

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any

questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at (202) 452-7932 at his earliest convenience.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: July 22, 2008 By: _____

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